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Nonequilibrium nitrogen excitation in NS discharge ANDREY STARIKOVSKIY, ARTHUR DOGARIU, Princeton University, JACOB GEORGE, Metro Laser Co, BENJAMIN GOLDBERG, RICHARD MILES, Princeton University — Nanosecond pulsed discharges are now widely used as a source of a spatially homogeneous, strongly nonequilibrium plasma. To create relatively dense, highly excited plasma in a few nanoseconds, it is necessary to maintain high values ??of the reduced electric field E/n, which ensures ionization of the gas. Experimental analysis and numerical modeling shows that under conditions of pulsed periodic discharges at high values ??of the reduced electric field, it is possible to effectively populate the vibrational levels of nitrogen. The difference from discharges at low reduced fields is the change of the population mechanism. If at low electron energies the main mechanism is the direct excitation of vibrationally excited states by electron impact, then at high values ??of the field (and mean electron energy) the main mechanism is the recombination flux to high-energy levels and redistribution of this population during the VT relaxation and VV exchanges.

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